IN THE CLAIMS:

Please cancel Claims 1-18, without prejudice or disclaimer of subject matter, and add new Claims 19-53. The following is a complete listing of the claims, and replaces all earlier versions and listings of the claims in the present application.

Claims 1-18 (canceled)

Claim 19 (new): An image processing apparatus that changes a dynamic range of an original image, comprising:

a gradation conversion unit adapted to perform a gradation conversion on the original image, based on a gradation conversion curve;

a high-frequency-component generation unit adapted to generate a high-frequency component of the original image or an image obtained from the gradation conversion performed on the original image by said gradation conversion unit;

a conversion unit adapted to convert a magnitude of an amplitude of the high-frequency component; and

a control unit adapted to control an addition of the high-frequency component converted by said conversion unit, after performance of the gradation conversion on the original image by said gradation conversion unit,

wherein said conversion unit converts the magnitude of the amplitude of the high-frequency component based on information concerning an inclination of the gradation conversion curve.

- 2 -

conversion unit converts the magnitude of the amplitude of the high-frequency component, based on the information concerning the inclination of the gradation conversion curve and a pixel value obtained based on the original image.

Claim 21 (new): An apparatus according to Claim 19, wherein said conversion unit converts the magnitude of the amplitude of the high-frequency component, based on a differential value of the gradation conversion curve.

Claim 22 (new): An apparatus according to Claim 19, further comprising an input unit adapted to input a variable for changing a form of the gradation conversion curve.

Claim 23 (new): An apparatus according to Claim 19, wherein said high-frequency-component generation unit generates a smoothened image of the original image, and generates the high-frequency component by subtracting the smoothened image from the original image.

Claim 24 (new): An apparatus according to Claim 19, wherein said high-frequency-component generation unit generates a smoothened image of the original image after the gradation conversion, and generates the high-frequency component by subtracting the smoothened image from the original image after the gradation conversion.

Claim 25 (new): An apparatus according to Claim 24, wherein the smoothened image is formed by using a morphological filter.

Claim 26 (new): An apparatus according to Claim 19, wherein said gradation conversion unit converts a form of the gradation conversion curve, based on a feature amount calculated based on the original image.

Claim 27 (new): An image processing apparatus comprising:

a smoothening unit adapted to obtain a smoothened image from an original image;

a high-frequency-component generation unit adapted to generate, as a high-frequency component, a difference between the smoothened image obtained by said smoothening unit and the original image;

a gradation conversion unit adapted to convert a gradation of the original image by using a gradation conversion curve;

a second smoothening unit adapted to obtain a second smoothened image from an image obtained from the gradation conversion performed by said gradation conversion unit; and

a high-frequency-component addition unit adapted to add the high-frequency component to the second smoothened image.

~~Claim 28 (new): An apparatus according to Claim 27, wherein said high-~~ frequency-component addition unit changes an amplitude of the high-frequency component, based on a pixel value obtained based on the original image, and adds the high-frequency component whose amplitude has been changed to the second smoothened image.

Claim 29 (new): An image processing apparatus comprising:

a smoothening unit adapted to obtain a smoothened image from an original image;

a high-frequency-component generation unit adapted to generate, as a high-frequency component, a difference between the smoothened image and the original image;

a gradation conversion unit adapted to convert a gradation of the smoothened image by using a gradation conversion curve; and

a high-frequency-component addition unit adapted to add the high-frequency component to the image whose gradation has been converted by said gradation conversion unit.

Claim 30 (new): An apparatus according to Claim 29, wherein said high-frequency-component addition unit changes an amplitude of the high-frequency component, based on a pixel value obtained based on the original image, and adds the high-frequency component whose amplitude has been changed to the image whose gradation has been converted.

Claim 31 (new): An image processing apparatus comprising:

a smoothening unit adapted to obtain a smoothened image from an original image;

a high-frequency-component generation unit adapted to generate, as a high-frequency component, a difference between the smoothened image obtained by said smoothening unit and the original image;

a gradation conversion unit adapted to convert a gradation of the original image by using a gradation conversion curve;

a conversion unit adapted to convert a magnitude of an amplitude of the high-frequency component, based on a value concerning an inclination of the gradation conversion curve; and

a high-frequency-component addition unit adapted to add the high-frequency component whose magnitude of the amplitude has been changed by said conversion unit to the image whose gradation has been converted.

Claim 32 (new): An apparatus according to Claim 31, wherein said conversion unit converts the magnitude of the amplitude of the high-frequency component, based on information concerning the inclination of the gradation conversion curve and a pixel value obtained based on the original image.

Claim 33 (new): An image processing apparatus comprising:

- 6 -

a gradation conversion unit adapted to obtain a converted image by

converting a gradation of an original image;

a smoothening unit adapted to obtain a smoothened image by smoothing the

converted image;

a high-frequency-component generation unit adapted to obtain, as a high-

frequency component, a difference between the smoothened image and the converted

image;

a conversion unit adapted to convert a magnitude of an amplitude of the

high-frequency component, based on a value concerning an inclination of a gradation

conversion curve; and

a high-frequency-component addition unit adapted to add the high-

frequency component whose magnitude of the amplitude has been converted by said

conversion unit to the converted image.

Claim 34 (new): An apparatus according to Claim 33, wherein said

conversion unit converts the magnitude of the amplitude of the high-frequency component,

based on information concerning the inclination of the gradation conversion curve and a

pixel value obtained based on the original image.

Claim 35 (new): An image processing method that satisfies relations of

$f0 (x, y) = F1 (f1 (x, y)$ and $c (x, y) = \partial F1 (f1 (x, y))/ \partial f1(x, y)$,

and is represented by an arithmetic expression of

$$fd\,(x,\,y) = f0\,(x,\,y) + (1 - c\,(x,\,y)) \times (fl\,(x,\,y) - fus\,(x,\,y)),$$

where F1 ( ) denotes a gradation conversion function, c(x, y) denotes a gradation

conversion ratio, fd (x, y) denotes a pixel value of a processed image, f0 (x, y) denotes a

pixel value of a first image, fl (x, y) denotes a pixel value of a second image, fus (x, y)

denotes a pixel value of a smoothened (low frequency) image of the second image, and x

and y denote coordinates on the image.

Claim 36 (new): An image processing method that satisfies relations of

$$f0\,(x,\,y) = F1\,(fl\,(x,\,y)) \text{ and } c\,(x,\,y) = \partial F1\,(fl\,(x,\,y)) / \partial fl(x,\,y),$$

and is represented by an arithmetic expression of

$$fd\,(x,\,y) = fuso\,(x,\,y) + a \times (1/c\,(x,\,y)) \times (f0\,(x,\,y) - fuso\,(x,\,y)),$$

where F1 ( ) denotes a gradation conversion function, c (x, y) denotes a gradation

conversion ratio, fd (x, y) denotes a pixel value of a processed image, f0(x, y) denotes a

pixel value of an image after gradation conversion, fuso (x, y) denotes a pixel value of a

smoothened (low frequency) image of the image after gradation conversion, fl (x, y)

denotes a pixel value of an image before gradation conversion, x and y denote coordinates

on the image, and a denotes a constant.

Claim 37 (new): An image processing method comprising:

a high-frequency-component conversion step of converting an amplitude of

a high-frequency component of an image, based on information concerning an inclination

of a gradation conversion curve; and

- 8 -

an addition step of adding the high-frequency component, converted in said high-frequency-component conversion step, to an arbitrary image.

Claim 38 (new): An apparatus according to Claim 23, wherein the smoothened image is formed by using a morphological filter.

Claim 39 (new): An image processing method for changing a dynamic range of an original image, comprising:

a gradation conversion step of performing a gradation conversion on the original image, based on a gradation conversion curve;

a high-frequency-component generation step of generating a high-frequency component of the original image or an image obtained from the gradation conversion performed on the original image in said gradation conversion step;

a conversion step of converting a magnitude of an amplitude of the high-frequency component; and

a control step of controlling an addition of the high-frequency component converted in said conversion step, after performance of the gradation conversion on the original image in said gradation conversion step,

wherein said conversion step converts the amplitude of the high-frequency component, based on information concerning an inclination of the gradation conversion curve.

- 9 -

Claim 40 (new): An image processing method comprising:

a smoothening step of obtaining a smoothened image from an original image;

a high-frequency-component generation step of generating, as a high-frequency component, a difference between the smoothened image obtained in said smoothening step and the original image;

a gradation conversion step of converting a gradation of the original image by using a gradation conversion curve;

a second smoothening step of obtaining a second smoothened image from an image obtained from the gradation conversion performed in said gradation conversion step; and

a high-frequency-component addition step of adding the high-frequency component to the second smoothened image.

Claim 41 (new): An image processing method comprising:

a smoothening step of obtaining a smoothened image from an original image;

a high-frequency component generation step of generating, as a high-frequency component, a difference between the smoothened image and the original image;

a gradation conversion step of converting a gradation of the smoothened image by using a gradation conversion curve; and

- 10 -

a high-frequency-component addition step of adding the high-frequency component to the image whose gradation has been converted in said gradation conversion step.

Claim 42 (new): An image processing method comprising:

a smoothening step of obtaining a smoothened image from an original image;

a high-frequency component generation step of generating, as a high-frequency component, a difference between the smoothened image obtained in said smoothening step and the original image;

a gradation conversion step of converting a gradation of the original image by using a gradation conversion curve;

a conversion step of converting a magnitude of an amplitude of the high-frequency component, based on a value concerning an inclination of the gradation conversion curve; and

a high-frequency-component addition step of adding the high-frequency component whose magnitude of the amplitude has been changed in said conversion step to the image whose gradation has been converted.

Claim 43 (new): An image processing method comprising:

a gradation conversion step of obtaining a converted image by converting a gradation of an original image;

a smoothening step of obtaining a smoothened image by smoothing the converted image;

a high-frequency-component generation step of obtaining, as a high-frequency component, a difference between the smoothened image and the converted image;

a conversion step of converting a magnitude of an amplitude of the high-frequency component, based on a value concerning an inclination of a gradation conversion curve; and

a high-frequency-component addition step of adding the high-frequency component whose magnitude of the amplitude has been converted in said conversion step to the converted image.

Claim 44 (new): A program product embodying a program for executing an image processing method for changing a dynamic range of an original image, the method comprising:

a gradation conversion step of performing a gradation conversion on the original image, based on a gradation conversion curve;

a high-frequency-component generation step of generating a high-frequency component of the original image or an image obtained from the gradation conversion performed on the original image in said gradation conversion step;

a conversion step of converting a magnitude of an amplitude of the high-frequency component; and

~~a control step of controlling an addition of the high-frequency component~~

converted in said conversion step, after performance of the gradation conversion on the

original image in said gradation conversion step,

wherein said conversion step converts the magnitude of the amplitude of the

high-frequency component, based on information concerning an inclination of the gradation

conversion curve.

Claim 45 (new): A program product embodying a program for executing an

image processing method, the method comprising:

a smoothening step of obtaining a smoothened image from an original

image;

a high-frequency-component generation step of generating, as a high-

frequency component, a difference between the smoothened image obtained in said

smoothening step and the original image;

a gradation conversion step of converting a gradation of the original image

by using a gradation conversion curve;

a second smoothening step of obtaining a second smoothened image from

an image obtained from the gradation conversion performed in said gradation conversion

step; and

a high-frequency-component addition step of adding the high-frequency

component to the second smoothened image.

Claim 46 (new): A program product embodying a program for executing an image processing method, the method comprising:

a smoothening step of obtaining a smoothened image from an original image;

a high-frequency-component generation step of generating, as a high-frequency component, a difference between the smoothened image and the original image;

a gradation conversion step of converting a gradation of the smoothened image by using a gradation conversion curve; and

a high-frequency-component addition step of adding the high-frequency component to the image whose gradation has been converted in said gradation conversion step.

Claim 47 (new): A program product embodying a program for executing an image processing method, the method comprising:

a smoothening step of obtaining a smoothened image from an original image;

a high-frequency-component generation step of generating, as a high-frequency component, a difference between the smoothened image obtained in said smoothening step and the original image;

a gradation conversion step of converting a gradation of the original image by using a gradation conversion curve;

a conversion step of converting a magnitude of an amplitude of the high-frequency component, based on a value concerning an inclination of the gradation conversion curve; and

a high-frequency-component addition step of adding the high-frequency component whose magnitude of the amplitude has been changed in said conversion step to the image whose gradation has been converted.

Claim 48 (new): A program product embodying a program for executing an image processing method, the method comprising:

a gradation conversion step of obtaining a converted image by converting a gradation of an original image;

a smoothening step of obtaining a smoothened image by smoothing the converted image;

a high-frequency-component generation step of obtaining, as a high-frequency component, a difference between the smoothened image and the converted image;

a conversion step of converting a magnitude of an amplitude of the high-frequency component, based on a value concerning an inclination of a gradation conversion curve; and

a high-frequency-component addition step of adding the high-frequency component whose magnitude of the amplitude has been converted in said conversion step to the converted image.

- 15 -

Claim 49 (new): A storage medium storing a program for executing an image processing method for changing a dynamic range of an original image, the method comprising:

a gradation conversion step of performing a gradation conversion on the image, based on a gradation conversion curve;

a high-frequency-component generation step of generating a high-frequency component of the original image or an image obtained from the gradation conversion performed on the original image in said gradation conversion step;

a conversion step of converting a magnitude of an amplitude of the high-frequency component; and

a control step of controlling an addition of the high-frequency component converted in said conversion step, after performance of the gradation conversion on the original image in said gradation conversion step,

wherein said conversion step converts the magnitude of the amplitude of the high-frequency component, based on information concerning an inclination of the gradation conversion curve.
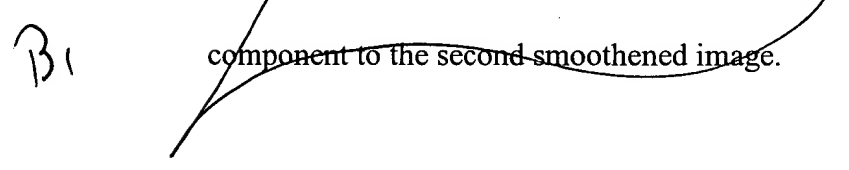
Claim 50 (new): A storage medium storing a program for executing an image processing method, the method comprising:

a smoothening step of obtaining a smoothened image from an original image;

a high-frequency-component generation step of generating, as a high-frequency component, a difference between the smoothened image obtained in said smoothening step and the original image;
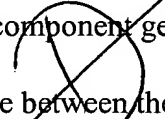
a gradation conversion step of converting a gradation of the original image by using a gradation conversion curve;

a second smoothening step of obtaining a second smoothened image from an image obtained from the gradation conversion performed in said gradation conversion step; and

a high-frequency-component addition step of adding the high-frequency component to the second smoothened image.

Claim 51 (new): A storage medium storing a program for executing an image processing method, the method comprising:

a smoothening step of obtaining a smoothened image from an original image;

a high-frequency-component generation step of generating, as a high-frequency component, a difference between the smoothened image and the original image;

a gradation conversion step of converting a gradation of the smoothened image by using a gradation conversion curve; and

a high-frequency-component addition step of adding the high-frequency component to the image whose gradation has been converted in said gradation conversion step.

- 17 -

Claim 52 (new): A storage medium storing a program for executing an image processing method, the method comprising:

a smoothening step of obtaining a smoothened image from an original image;

a high-frequency-component generation step of generating, as a high-frequency component, a difference between the smoothened image obtained in said smoothening step and the original image;

a gradation conversion step of converting a gradation of the original image by using a gradation conversion curve;

a conversion step of converting a magnitude of an amplitude of the high-frequency component, based on a value concerning an inclination of the gradation conversion curve; and

a high-frequency-component addition step of adding the high-frequency component whose magnitude of the amplitude has been changed in said conversion step to the image whose gradation has been converted.

Claim 53 (new): A storage medium storing a program for executing an image processing method, the method comprising:

a gradation conversion step of obtaining a converted image by converting a gradation of an original image;

a smoothening step of obtaining a smoothened image by smoothing the converted image;

- 18 -

a high-frequency-component generation step of obtaining, as a high-frequency component, a difference between the smoothened image and the converted image;

a conversion step of converting a magnitude of an amplitude of the high-frequency component, based on a value concerning an inclination of a gradation conversion curve; and

a high-frequency-component addition step of adding the high-frequency component whose magnitude of the amplitude has been converted in said conversion step to the converted image.